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ABSTRACT

This report demonstrates the complexity and diversity of agricultural structures in the United States and discusses changes produced in the family farm by agricultural industrialization. Data from the Economic Research Service of the U.S. Department of Agriculture and the 1978 Census of Agriculture describe similarities and differences in social and technical arrangements of farms. A comparative analysis of production systems examines agricultural diversity in commodities produced, organizational characteristics of farms, personal characteristics of farm operators, and farm corporate structures. Discussion of the interchange between agricultural structures and rural communities includes impacts of farm population changes on rural communities and impacts of community growth on farming. The report examines a U.S. Department of Agriculture proposal to establish four categories of farms based on farm sales as a focus for future research and extension policies and programs. Discussion of the strategy includes identification of proposed research and extension efforts in each category and a critique of the four-category approach. Farms as organizational units of production are examined for the nation as a whole and for 10 leading agricultural producing states, including Texas. Tables containing supplementary data are placed throughout the text. A six-page list of references concludes the document. (LFL)

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The Industrialization of Agriculture in Texas and the Nation: Implications for the Family Farm, Community, and Land Grant University System

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INTRODUCTION

Policymakers and others have long espoused the importance of the family farm system of agriculture for this Nation's well-being. The development of policies and programs to support an agricultural structure based on family farms has been influenced largely by a perspective that the family farm is important to society both as a business and as a way of life. As a business, the family farm is considered to be a trustworthy provider of this Nation's supply of food and fiber (Griswold, 1948; Kolb and Brunner, 1952; Penn, 1979). In fact, it was generally assumed that "producers responded automatically to the needs of the consumer through the mechanism of the marketplace. If the country saw to the needs of the producers, consumer well-being would follow as the night the day" (Paarlberg, 1980: 6).

As a way of life, the family farm system of agriculture has been characterized by such values esteemed in American society as independence and self-reliance (Penn, 1978). In addition, the family farm has been viewed as an efficient user and protector of the environment and its natural resources (Buttel and Larson, 1979). Still others believe the family farm system of agriculture to be a major contributor to the quality of life in rural communities (Heffernan, 1982).

In support of these views, agricultural development policies and programs have placed a high priority on research and education to help the individual farm unit increase farm

productivity and lower costs per unit of farm output. According to the U.S. Department of Agriculture (1981: 127):

> The cooperative system of agricultural research and extension of that research into practical fields of application, as carried out by the Department of Agriculture and the Land-Grant colleges, is one of the oldest farm-related activites of the Government. It was founded on the belief that the application of scientific methods to the problems of agriculture would enhance the welfare of rural Americans and improve the food supply for all citizens.

In carrying out its research and extension efforts to help the individual farm increase farm productivity, the Land Grant University System emphasized the importance of the economic viability of the farm. Caldwell (1978: 264) states:

> . . . In primitive agriculture all farms were self-subsistence farms and supported a primitive existence. Practically all farms today are commercial farms. To be a happy human experience or even a tolerable human experience, the farm has to be profitable. Our research and extension efforts have been aimed at making farming happy and profitable for those who farm. Only a sound economic unit can pay a decent wage to a farm worker and provide a decent return to the owner and his family for their investment and labor. Our objective has been to make the farm unit a viable, economic human enterprise.

Supported by agricultural development policies and programs that emphasized research and extension efforts to make the individual farm unit a viable economic human enterprise, the Land Grant Universities and USDA developed the science-producing base upon which the modern, highly industrialized agriculture of the United States was built (Cochrane, 1979). In turn, the mechanical, chemical, and biological technology adopted by American farmers enabled the United States to make dramatic increases in agricultural production, in both volume and labor

efficiency--a feat accomplished as rapidly as any comparable activity in recorded history (Cochrane, 1979; Gregor, 1982).

The consequences of the industrialization of agriculture have been numerous and far reaching. One consequence is that the American farmer has become one of the most efficient food producers the world has ever known. With modern technology a farmer can now produce more food and fiber per unit of input than ever before. In fact, less than 3 percent of the American population today produces enough food and fiber for the other 97 percent with enough remaining for considerable exports abroad.

A second consequences is that the overall standard of living of American society has been enhanced. The economies of mass production upon which modern standards of living are based would not be possible if agricultural production took place in self-sufficient farm households (Samuelson, 1964).

The industrialization of agriculture also has contributed to internal changes in the structure of the family farm system of agriculture. That is, the size and ownership of the farm operation, the organization and use of resources in farming, the commodities produced, the form of the business organization and the manner in which business decisions are made, the manner in which the farming unit procures its input and markets its products, the ease of entry into farming as an occupation, and the extent to which operators depend on farm income (as opposed to nonfarm income) has changed with each succeeding enumeration of the agricultural census (Penn, 1979).

In sum, the industrialization process has enabled American farmers to become extremely efficient food and fiber producers and is at least partially responsible for improving the standard of living of American society. Conversely, traditional farming patterns have been dramatically altered in that the production of agricultural commodities has become increasingly complex and concentrated on fewer and fewer farms (Paarlberg, 1980; Stockdale, 1982; Gregor, 1982). In addition, farming has become highly integrated into a system of corporations and regulatory agencies. As a consequence, agriculture is not only supplied and marketed through corporations, but it also is increasingly a corporate activity (Albrecht, 1982).

While most would agree that the organizational structure of the family farm system of agriculture will continue to undergo internal changes (Babb, 1979), there is not agreement as to whether these changes will be beneficial, destructive, or a mixture of good and bad to agriculture and American society. Nor is there agreement on the criteria that should be used to measure the consequences of such changes.

Healy and Short (1981) explain that there has always been tension between the Jeffersonian ideal of a nation of small landowners and the widely-held belief that the market should be allowed to function, even if it means that the most successful market participants may accumulate large amounts of wealth in land. So long as land was fairly easily available to anyone who could make productive use of it, societal goals for farm size

could be defined in explicit economic terms. Under those conditions, a major criterion of farm structure was to insure optimum utilization of resources for food and fiber production (Raup, 1972).

Today, however, land market forces are reflecting increased competition for all types of rural land. As a consequence, the value of farmland for nonfarm use is impacting on the value of land for agricultural production (Healy and Short, 1981; Pope, 1983). In addition, American society is becoming increasingly concerned about the equitable distribution of policy and program benefits within the farm structure and the consequences of changes in agriculture on the farm community, population distribution and rural amenities (Raup, 1972).

If these conditions continue, the criteria necessary to measure consequences of changes in farm structure will be more closely tied to society's concern for future settlement policy, the configuration of urban places, and the generation of an economic base that can make life rewarding in smaller towns. In fact, Raup (1972) believes that given the levels of efficiency that can be achieved on moderate sized farms in American agriculture, the question of farm size and expansion is largely irrelevant on agrotechnical grounds. It is, however, highly relevant on social, political and cultural grounds in an urban-industrialized society.

Although the debate on the criteria necessary to measure the consequences of change in the structure of agriculture may never

be fully resolved, several points have emerged. First, policy issues affecting agriculture are now being generated by nonfarm people representative of a largely urban America and concerned primarily with consumer issues, environmental programs and rural development (Paarlberg, 1980). To them, farm efficiency, in a micro sense, generally is not acceptable as the decisive criterion for agricultural change (Paarlberg, 1981). Second, food has become a major instrument in economic and foreign policy. Supporters of food as a foreign policy tool, and others, argue that efficiency and productivity of the farm are key concerns that cannot be ignored (Stockdale, 1982). Third, as reflected in the Food and Agricultural Act of 1977, the Congress of the United States is committed to a family farm system of agriculture. They state:

> Congress hereby specifically reaffirms the historical policy of the United States to foster and encourage the family farm system of agriculture in this country. Congress firmly believes that the maintenance of the family farm system is essential to the social well-being of the Nation and the competitive production of adequate supplies of food and fiber. Congress further believes that any significant expansion of non-family owned, large scale corporate enterprises will be detrimental to the national welfare.

In essence, the industrialization of agriculture has increased the complexity of the interchange between agriculture and American society. In addition, the nonfarm population of rural areas is increasing in number and more complex social structures have developed within and between agriculture and the communities in which farmers reside. Knowledge of this interchange is necessary if those who are now generating issues

affecting agriculture are to better understand the implications of the industrialization of agriculture for the family farm, the community, and the research and extension efforts of Land Grant Universities.

The implications of this interchange cannot be clearly established, however, without an understanding of the diversity of agriculture. This is because the structure of agriculture is not a given--it is itself the result of social processes that have been implemented by farms as organizational units of production in adapting to internal and external conditions (see Homans, 1961). In other words, different types of farms, both within and between regions of this Nation, are not affected equally by external changes in agriculture, by fluctuations in commodity prices or by changes in agricultural policies. An examination of the structural characteristics of such farms provides evidence on how different types of farms are changing, as well as responding to, a turbulent environment of high costs of production, inflation and instability of demand for agricultural commodities.

It is one purpose of this manuscript to describe similarities and differences in social and technical arrangements of farms that constitute the structure of production agriculture. To accomplish this task, a comparative analysis of production systems of agriculture will be made by examining the diversity of agriculture on the following indictors: the commodities produced, organizational characteristics of farms and personal

characteristics of farm operators, and the corporate structure of farms.

A second task will be to examine the interchange between the structure of agriculture and the rural community. The impact of changes in the farm population on rural communities will be reviewed. In addition, the impact of community growth on the farm population will be described.

The final task of this manuscript is to examine one strategy advocated to help provide a focus for future agricultural research and extension policies and programs and to insure that agricultural policy will work equitably for all involved. The United States Department of Agriculture (USDA) has delineated four categories of farms based on farm sales and has recommended certain types of research and extension efforts be addressed to each category (U.S. Department of Agriculture, 1981). USDA assumes that such research and extension efforts will help the stability of different types of farms. This section of the manuscript will describe the composition of the four categories, identify the proposed research and extension efforts to be directed toward each category and discuss strengths and weaknesses in using the four categories.

In implementing these three tasks, farms as organizational units of production will be examined for the Nation and the ten leading agricultural producing states in the Nation. This approach is being utilized because agricultural structure is so

diversified both between and within states that potential impacts on the structure and organizations of farms or on the interchange between farm and other organizations will be different for individual states.[1] The information used in this report is taken primarily from two sources: the Economic Research Service of USDA and the 1978 Census of Agriculture, prepared by the U.S. Department of Commerce's Bureau of the Census in cooperation with USDA.

[1]For a discussion of differences within a state (Texas), see Albrecht and Ladewig, (1982a).

DIVERSITY OF AGRICULTURE IN TEXAS AND THE NATION

Rural America has always exhibited regional diversity. Hobbs and Dillman (1982) point out that rural regions were once largely defined by dominant crops and the forms of culture that were associated with the way crops were produced. For example, the South was the Cotton Belt, the Midwest was the Corn Belt, and the Plains States were the Wheat Belt. Hobbs and Dillman (1982) further point out that this categorization of regions by major crops also reflected regional variations in lifestyles and culture. Migratory workers were associated with such fruit and vegetable producing states as California, Florida, and Texas; rural Blacks were predominant in the Cotton Belt; and European immigrants could be found in the Corn and Wheat Belts.

The industrialization of agriculture, however, has reduced the accuracy of regional categories in describing lifestyles or agricultural structure. There is now great diversity both between and within regions in what farms produce and how farms are organized and managed (Schertz and others, 1979).

Leading Agricultural States

The nature and importance of American agriculture varies tremendously from one part of this country to another. The Nation's ten leading states in terms of agricultural sales are listed in Table 1. These ten states accounted for over one-half of the Nation's farm sales in 1980. Table 1 also reflects the geographic diversity of this Nation's agriculture in that the

Table 1: Cash Receipts from Farm Sales for the Nation and the 10 Leading Agricultural States, 1980 (In Millions of Dollars)

State	Cash Receipts ($1,000,000) Total	(%)	Livestock	(%)	Crops	(%)
California	13,539	(9.9)	$ 4,149	(30.6)	$ 9,390	(69.4)
Iowa	10,040	(7.4)	5,487	(53.0)	4,553	(47.0)
Texas	8,954	(6.6)	5,188	(58.0)	3,766	(42.0)
Illinois	7,891	(5.8)	2,312	(29.3)	5,579	(70.7)
Minnesota	6,292	(4.6)	3,404	(52.5)	2,988	(47.5)
Nebraska	6,075	(4.5)	3,571	(58.8)	2,504	(41.2)
Kansas	5,887	(4.3)	3,362	(57.1)	2,525	(42.9)
Wisconsin	4,712	(3.5)	3,744	(79.4)	968	(20.6)
Indiana	4,508	(3.3)	1,662	(36.9)	2,846	(63.1)
Missouri	4,105	(3.0)	2,181	(53.1)	1,924	(46.9)
NATION	136,431		67,405	(49.4)	69,026	(50.6)

SOURCE: Economic Research Service, 1980. **Economic Indicators of the Farm Sector: State Income and Balance Sheet Statistics, 1980.** USDA Statistical Bulletin No. 678, Washington, D.C.: U.S. Government Printing Office.

three leading agricultural producing states (California, Iowa, and Texas) are located in three different sections of the Nation. These three states accounted for nearly one-fourth of all cash receipts from the marketing of farm products in 1980 and, as will be discussed later, have reached national prominence with very different farm structures.

Diversity of Commodities

For the Nation, 1980 cash receipts were nearly evenly divided between livestock (49.4%) and crops (50.6%). However, a comparison of individual states to the national average indicates that in 3 of the top 10 states (California, Illinois, and Indiana), crops accounted for over 60 percent of the cash receipts. Conversely, livestock sales were most important in 4 states (Texas, Nebraska, Kansas, and Wisconsin). Cash receipts for the remaining 3 states (Iowa, Minnesota and Missouri) were more uniformly divided between livestock and crops.

The diversity of major agricultural commodities produced in the Nation and each of the ten top agricultural states is illustrated in Table 2. The marketing of cattle and calves accounted for nearly 23 percent of this Nation's agricultural cash receipts in 1980. The other leading commodities in terms of cash receipts included dairy products, soybeans, and corn.

Commodity production was quite diversified in six states (California, Iowa, Illinois, Minnesota, Indiana, and Missouri). In California, for example, dairy products received the most cash

Table 2: Major Commodities Produced by the Nation and the 10 Leading Agriculture States and the Percentage of Total Sales, 1980

State	Commodities (Percentage of Total Sales)			
California	Dairy Products (13.1)	Cattle/Calves (10.6)	Cotton (8.2)	Grapes (8.2)
Iowa	Cattle/Calves (26.0)	Corn (23.7)	Hogs (21.9)	Soybeans (20.1)
Texas	Cattle/Calves (43.8)	Cotton (12.4)	Dairy Products (5.6)	Wheat (5.4)
Illinois	Corn (34.4)	Soybeans (30.2)	Hogs (13.1)	Cattle/Calves (11.1)
Minnesota	Dairy Products (18.7)	Cattle/Calves (16.9)	Soybeans (15.9)	Corn (14.4)
Nebraska	Cattle/Calves (45.9)	Corn (21.0)	Hogs (9.2)	Wheat (7.0)
Kansas	Cattle/Calves (48.2)	Wheat (27.0)	Corn (5.1)	Sorghum (5.0)
Wisconsin	Dairy Products (58.6)	Cattle/Calves (11.9)	Corn (9.1)	Hogs (5.3)
Indiana	Corn (29.8)	Soybeans (24.5)	Hogs (14.3)	Cattle/Calves (10.5)
Missouri	Soybeans (26.4)	Cattle/Calves (24.2)	Hogs (14.9)	Dairy Products (8.7)
NATION	Cattle/Calves (22.8)	Dairy Products (12.2)	Soybeans (9.8)	Corn (9.4)

SOURCE: Economic Research Service, 1980. **Economic Indicators of the Farm Sector: State Income and Balance Sheet Statistics, 1980.** USDA Statistical Bulletin No. 678, Washington, D.C.: U.S. Government Printing Office

receipts of any commodity but accounted for only thirteen percent of the total cash receipts received by California producers in 1980. In Iowa--the number two ranking agricultural state--four commodities (cattle/calves, corn, hogs, and soybeans) each contributed over twenty percent to the state's total cash receipts.

In contrast, one commodity dominated the cash receipts of the four remaining states. For Texas, Nebraska, and Kansas, the primary commodity was cattle and calves. In Wisconsin, dairy products accounted for nearly sixty percent of the cash receipts.

Because of the volume and diversity of agricultural products produced within states, the agricultural marketplace has affected the cash receipts of the various states differently over time. Figure 1 reflects cash receipts from farm marketings for the 10 leading states for 1978 through 1980. Six states (California, Iowa, Illinois, Minnesota, Wisconsin, and Indiana) experienced sizable increases in cash receipts for each of the time periods examined. Two states (Texas and Kansas) had sizable increases from 1978 to 1979 but also incurred sizable decreases in cash receipts from 1979 to 1980. In fact, the decrease in cash receipts in Texas from 1979 to 1980 amounted to over $900 million. Two other states, Nebraska and Missouri, experienced sizable increases from 1978 to 1979 but showed little change between 1979 and 1980.

A comparison of Figure 1 with Table 2 reveals that those states producing a diversity of major commodities have fared

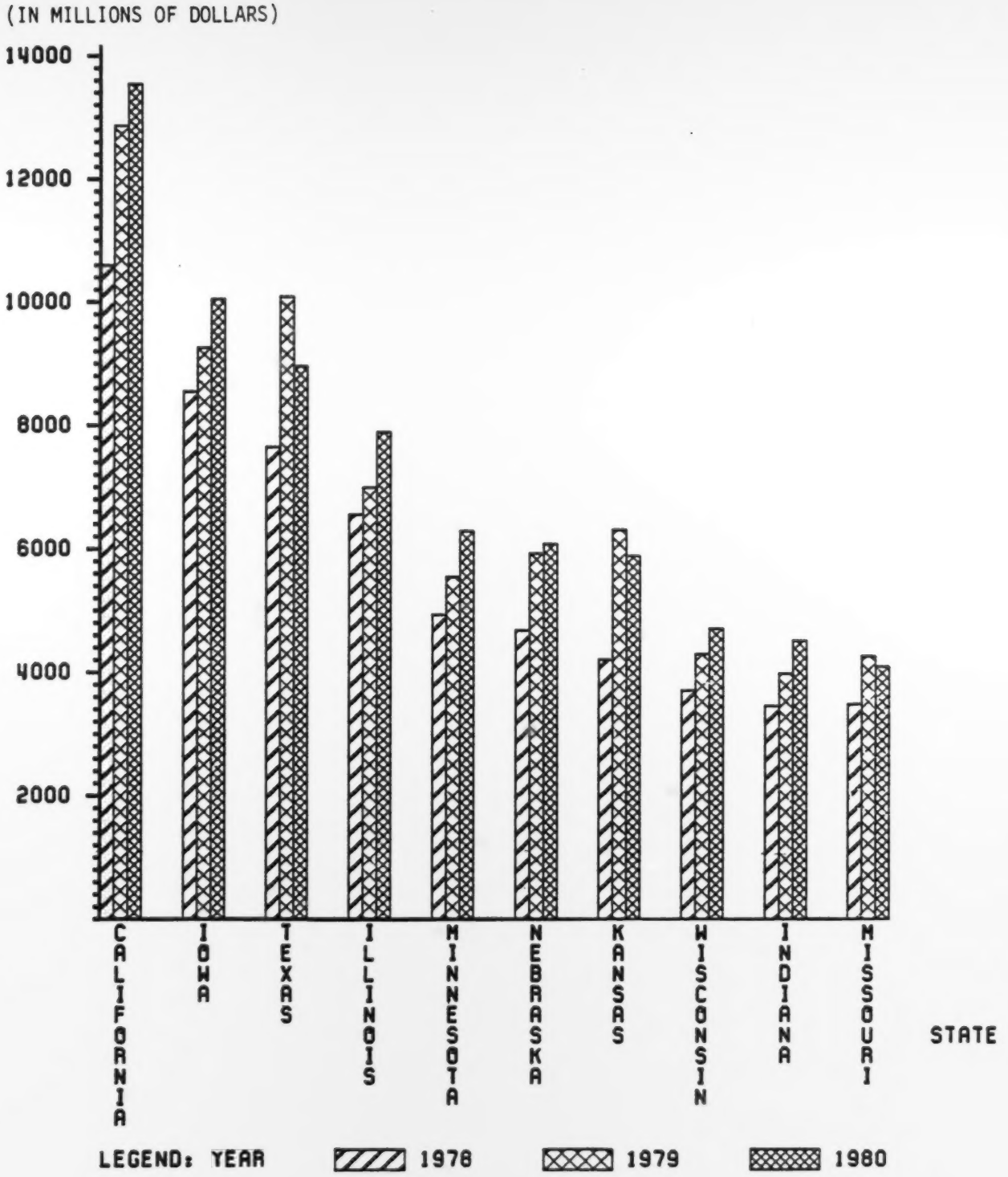

Figure 1: Total Cash Receipts from Farm Sales for the 10 Leading Agricultural States, 1978-80

SOURCE: Economic Indicators of the Farm Sector; State Income and Balance Sheet Statistics, 1980. USDA, Economic Research Service, Statistical Bulletin No. 678.

better economically in recent years than have those states primarily dependent upon one commodity. Of the 6 states experiencing sizable gains in cash receipts each year, 5 (California, Iowa, Illinois, Minnesota, and Indiana) depended upon a diversity of commodities for their cash receipts. Wisconsin was the only state heavily dependent upon one commodity (dairy products) to experience sizable gains each year.

Of the 4 states that did not experience consistent growth in cash receipts from the sale of agricultural products, 3 (Texas, Nebraska, and Kansas) depended heavily upon one commodity--cattle and calves--for cash receipts. Between 1979 and 1980 the cow-calf industry experienced a sizable reduction in both the number of animals sold and the price received per animal. Consequently, the cash receipts received by producers in this Nation from the sale of cattle and calves declined by 3.2 billion dollars from 1979 to 1980 (Economic Research Service, 1981b).

Diversity of Farms

From the beginning of this century until about 1940, the number of American farmers exceeded 6 million and reached a peak of about 6.8 million farms in 1935. From 1935 to 1978, the number of farms in the United States decreased by 64 percent. As reported in Table 3, there were nearly 2.5 million farms in the United States in 1978. The number of farms in Texas has followed a similar trend, reaching a peak of slightly more than one-half million farms during the depression of the 1930s and declining rapidly thereafter.

Table 3 lists the number of farms for the 10 leading agricultural states in the Nation in 1978. Texas had more farms (194,253) and had more land in farms (137,547,000 acres) than any other state in 1978. In fact, 13.4 percent of America's farmland is in Texas.

Accompanying the trend toward fewer farms is an increase in the size of the average farm. In 1910, for example, the average American farm was 139 acres. In comparison, the average farm in 1978 was 415 acres--about three times as large (U.S. Department of Commerce, Bureau of the Census, 1981). Of the 10 leading states listed in Table 3, Texas had the largest average farm size (708 acres) followed by Nebraska (702) and Kansas (619).

The trend towards fewer and larger farms was apparent for the Nation and for 9 of the 10 leading agricultural states between 1969 and 1978. The trends in California, however, were not consistent with the national trends. Between 1969 and 1978, the number of farms in California increased, while the size of the average California farm decreased.

When all 50 states are considered, there is considerable variation in the size of the average farm. In 1978, Arizona had the largest average farm size in the nation (5,047 acres). In 8 other states, the average farm was greater than 1,000 acres (Wyoming, Nevada, New Mexico, Alaska, Montana, Colorado, South Dakota, and North Dakota). At the other extreme, the average farm in Rhode Island was 86 acres. Farms also were extremely

Table 3: Number of Farms, Average Farm Size, Land in Farms, Percent of State Land in Farms, Harvested Cropland, and Irrigated Acreage for the 10 Leading Agricultural States and the Nation, 1978

State	Number of Farms	Average Farm Size (acres)	Land in Farms (1,000 acres)	Percent of State Land in Farms	Harvested Cropland (1,000 acres)	Irrigated Land (1,000 acres)
California	81,706	405	33,130	33.1	8,899	8,604
Iowa	126,456	266	33,581	93.8	23,799	101
Texas	194,253	708	137,547	82.0	20,781	7,018
Illinois	109,924	270	29,731	83.3	22,823	130
Minnesota	102,963	279	28,679	56.5	19,199	272
Nebraska	65,916	702	46,273	94.5	16,442	5,698
Kansas	77,129	619	47,747	91.2	19,092	2,686
Wisconsin	89,945	201	18,106	51.9	9,965	235
Indiana	88,427	193	17,037	73.7	11,910	75
Missouri	121,955	253	30,849	69.9	12,664	344
NATION	2,478,642	415	1,029,695	45.9	320,666	50,838

SOURCE : U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

small in New Jersey, Connecticut, and Massachusetts (U.S. Department of Commerce, Bureau of the Census, 1981).

Table 3 also reports the percent of land in farms, harvested cropland, and irrigated acreage for the 10 leading agricultural states in 1978. Nationwide, less than one-half (45.4%) of the total land is in farms. Of the 10 leading agricultural states, Nebraska has the largest percentage of land in farms (94.5%) followed by Iowa, Kansas, Illinois, and Texas. Conversely, only one-third of California's land is devoted to farming.

There also is considerable diversity in the productivity of farmland. Much of the farmland in the western states (including parts of West Texas) is in nonirrigated rangeland where production potential is much less than in areas having harvested cropland. Although these rangeland operations generally are very large in size, their productivity per acre is quite low. Of the states listed in Table 3, more than 65 percent of the land in farms was being used for crop production in Illinois, Iowa, Indiana, and Minnestoa. On the other hand, only 15 percent of the farmland in Texas was harvested cropland. Nevertheless, Texas ranked third in the Nation in the amount of harvested cropland in 1978, behind Iowa and Illinois (Table 3). These 3 were the only states in the Nation with over 20 million acres of harvested cropland.

Irrigation plays a vital role in agricultural production and is especially important in the Western and Great Plains states. Nationwide, over 50 million acres of land were irrigated in 1978

(Table 3). California had the most (8.6 million acres), followed by Texas (7.0 million), Nebraska (5.7 million), Idaho (3.5 million), and Colorado (3.5 million) (U.S. Department of Commerce, Bureau of the Census, 1981). In the decade between 1969 and 1978, the number of acres under irrigation in the United States increased by about 12 million. The greatest increase was in Nebraska where about 3 million new acres were put under irrigation during the decade. At the same time, the number of acres irrigated in California and Kansas increased by more than one million.

Most of the irrigated acres in Texas are in the High Plains region of the state, where extensive amount of water are drawn from the Ogallala aquifer. This aquifer also furnishes vast amounts of irrigation water for other areas in the Great Plains. Pumpage from this aquifer is considerably greater than the estimated natural recharge. Thus, in the long term, the Ogallala may not support the irrigation of crops at its present rate of usage. In addition, rising fuel prices are decreasing the feasibility of pumping groundwater for irrigation purposes. Without irrigation, the structure of agriculture in both the Texas High Plains and the Great Plains states may change considerably.

Farm Tenure

There are three basic categories into which farm operators can be classified relative to their tenure patterns. The first is full-owners. This group consists of farmers who hold title to

all of the land they operate. If a farmer holds title to part of the acreage he operates, and rents additional land, he is called a part-owner. The third category, tenants, own none of the land they farm. In recent years, there has been a nationwide trend toward an increase in the number of part-owner farms with a corresponding decrease in the percentage of tenants. Historically, tenancy (especially sharecropping) has been especially prevalent in the South). Recently, however, the number of tenants in the South has diminished considerably (Larson, 1981).

As illustrated in Table 4, the majority (58.6%) of the farms in the United States in 1978 were operated by full-owners, while about one-fourth of the operators were part-owners, and one of 12 were tenants. Although these national figures were similar to the figures for Texas, there was considerable diversity in the tenure patterns of the other leading agricultural states. The proportion of full-owners ranges from 71.6 percent in California to 40.6 percent in Nebraska. As indicated in Table 4, tenancy was most substantial in the Midwestern states of Iowa, Illinois and Nebraska where more than 1 of every 5 farms was tenant operated.

Table 5 indicates that part-owner farmers nationally were, on the average, larger (708 acres) than either full-owner farms (205 acres) or tenant farms (384 acres). Thus, although part-owner farms comprised about one-fourth of the farms, they accounted for over one-half (54.9%) of the land in farms in the

Table 4: Tenure of Operator by Number of Farms, Land in Farms, and Value of Agricultural Products for the 10 Leading Agricultural States and the Nation, 1978.

State	Number of Farms (Percent)			Land in Farms (Percent)			Value of Sales (Percent)		
	Full Owner	Part Owner	Tenant	Full Owner	Part Owner	Tenant	Full Owner	Part Owner	Tenant
California	71.6	16.3	12.1	28.6	53.2	18.2	38.8	41.6	19.6
Iowa	46.5	31.3	22.2	29.0	50.1	20.9	29.9	50.8	19.3
Texas	56.5	29.3	14.2	32.5	50.0	17.5	45.7	40.0	14.3
Illinois	43.7	34.8	21.5	21.5	56.2	22.3	21.5	55.7	22.8
Minnesota	56.0	31.9	12.1	38.0	51.5	10.5	38.1	51.2	10.7
Nebraska	40.6	37.9	21.5	23.8	61.3	14.9	31.1	54.1	14.8
Kansas	41.3	41.9	16.8	19.3	66.9	13.8	39.7	48.4	11.9
Wisconsin	62.1	30.3	7.6	47.5	45.8	6.7	41.9	50.3	7.8
Indiana	58.0	29.9	12.1	30.6	52.2	17.2	30.4	57.2	12.4
Missouri	67.0	23.2	9.8	46.7	43.6	9.7	42.3	46.3	11.4
NATION	58.6	28.7	12.7	33.1	54.9	12.0	37.8	48.6	13.6

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

Table 5: Average Farm Size and Average Sales per Farm by Tenure of Operator for the United States and Texas, 1978

	United States			Texas		
	Full-owner	Part-owner	Tenant	Full-owner	Part-owner	Tenant
Average Farm Size (acres)	205	708	384	406	1,207	866
Average Sales per Farm (dollars)	28,135	73,530	46,731	34,610	58,286	43,147

SOURCE: U.S. Deparment of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

Nation in 1978. This pattern of larger part-owner farms is also evident in Texas. In 1978, the average part-owner farm was 1,207 acres, compared to 866 acres for the average tenant farm, and 406 acres for the average full-owner farm. Part-owner farms accounted for 50 percent of the land in farms in Texas.

Average sales per farm also are greater for part-owner farms in both Texas and the Nation. As shown in Table 5, sales from the average part-owner farm in the United States were $73,530 compared to $43,731 for the average full-owner farm. The trends were similar in Texas, with the largest sales per farm on part-owner farms and the lowest sales per farm on full-owner farms. Again tenant farms were intermediate.

One possible explanation for the growth in part-owner farms is that costs of ownership of land versus the cost of renting the land appear to favor renting. Hottel and Harrington (1979) explain that by not having to make larger land payments, farmers receive larger net incomes and can therefore use limited capital to operate larger farms. Larger farms were desired, generally, because it was assumed that as farm size increased, production costs would decrease. A second reason for the increase in part-owner farms is that farmland has proven to be a hedge against inflation because of the rising prices of farmland. Finally, competition for land by nonagricultural users may be creating high land prices which are influencing farmland owners to sell part of their farms to nonagricultural users.

Age and Sex Characteristics

Just as the structure of farm operations in the United States has changed in recent years, so have the characteristics of persons operating these farms. As shown in Table 6, about 5 percent of the Nation's farm operators are female. Of the Nation's leading agricultural states, the Midwestern states of Minnesota, Iowa, and Nebraska had the lowest proportion of female operators. The proportion of female farm operators not only is increasing, farm wives also are becoming increasingly important in the nonfarm labor force (Maret and Copp, 1982).

In 1978, the average American farmer was about 50 years old. There has been a gradual but steady increase in the average age of farm operators since 1945. This is occurring because many older persons who leave farming due to retirement or death are not replaced by younger farm operators (Economics, Statistics, and Cooperatives Service, 1979). As shown in Table 6, the average Texas farmer is slightly older (52.3 years old) than in the rest of the Nation (50.1 years old). The fact that there are so many farmers in the older age categories has important farm policy implications in that the economic costs to enter farming are extremely high.

Organization of Farms

The industrialization of agriculture has dramatically changed both the structure of agriculture and how some commodities are produced. Paarlberg (1980), for example,

Table 6: Percent Female Farm Operators and Average Age of Farm Operators for the 10 Leading Agricultural States and the Nation, 1978

State	Percent Female Operators	Average Age of Operator
California	7.6	50.8
Iowa	2.4	47.2
Texas	6.1	52.3
Illinois	3.0	49.0
Minnesota	2.1	47.5
Nebraska	2.6	48.6
Kansas	3.6	50.5
Wisconsin	3.5	48.6
Indiana	3.2	48.8
Missouri	5.0	50.4
Nation	5.2	50.1

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

believes that broiler production now bears a closer resemblance to the automobile industry than to the traditional family farm.

Some believe that changes in the structure of agriculture are indicative of the development of a dualistic farm system. According to Stockdale (1982), one part of this dualistic system is composed of a large number of small part-time, subsistence, retirement, and hobby farms, while the other is a smaller number of large, highly capitalized, commercial farms.

One potential consequence of a dual system of agriculture is that the family farm could be replaced by a system in which agricultural production is based on giant, corporate-type farms and characterized by a separation of capital, management, and labor. Typically, evidence given for this position includes the continuing decline in the number of family farms, and the increased importance of farm sales from large corporate farms, including some large nonfarm corporations such as Boeing, Greyhound, Tenneco, Coco-Cola, and Gates Rubber (Barnes and Casalina, 1972; Hightower, 1971). Between 1969 and 1978, the number of corporate farms in the United States increased by 138 percent.

Replacement of the family farm by large-scale corporate farms could have several negative consequences (Berry, 1977; Dechant, 1970). First, a valuable way of life would be lost if the independent family farmer becomes an employee on a factory-type farm (Stockdale, 1982). A second consequence is that large-scale farming could result in the development of two rather

distinct social classes in rural America (Heffernan, 1972; Smith, 1969; Goldschmidt, 1978a). Third, agricultural production could become dominated by a few huge firms who could develop monopolistic powers and control the marketplace. Fourth, the development of large-scale agriculture could have detrimental effects on many rural communities (Goldschmidt, 1978b) and negative consequences for many small businesses (Bible, 1972).

Conversely, others argue that while family farm numbers have declined, the relative position of the family farm has not changed. Family farmers still own most of the land and capital associated with agricultural production, provide most of the farm labor, and have the majority of the agricultural sales (Soth, 1971; Nikolitch, 1972; Reimund, 1979; Gardner and Pope, 1978). Supporters of this view contend that if a family farm is defined as a farm on which the farmer and his family supply most of the labor, then family farms constitute 95 percent of all farms, and produce about two-thirds of the total agricultural products sold (Nikolitch, 1972). Paarlberg (1980) reports that these figures have not changed appreciably in decades.

Still others point out that much of the recent increase in the number of corporate farms has come from the incorporation of family farms. That is, the vast majority of farming corporations in the United States are family farms that have chosen to incorporate for various business reasons such as for tax purposes, for managerial advantages, for better access to credit, and for easing the transfer of the farm between generations

(Morris, 1970). In most respects, other than their legal form, family corporate farms are indistinguishable from ordinary large family farms. The same could be said for nearly all farm partnerships (Coffman, 1973; Reimund, 1979; Paarlberg, 1980).

A final argument in support of this alternative view on the status of the family farm is that large-scale corporate farming has successfully entered only those areas of agriculture that are characterized as being capital intensive and experiencing rapid technological change (Seckler, 1969). Murray (1970: 37) adds that nature and space, the two dominant factors in farming, do not fit the mechanized factory-type system.

To determine the role and contribution of farms by organizational arrangement in Texas and the Nation, this section will contrast family farms, partnerships, family-held corporate farms, and corporate farms that are not family-held. Indicators will be used that describes the organization of farms in both Texas and the Nation relative to the number of farms, the land in farms, and the value of agricultural sales. In addition, the major commodities produced by corporate and family farms will be examined.

Number of Farms. In terms of number of farms, the family farm is still dominant. As indicted in Table 7, nearly 90 percent of farmers in both Texas and the Nation were classified as family farms in 1978. Of the remaining Texas farms, 8.7 percent were partnerships, 1.1 percent were family-held corporate farms and 0.2 percent were nonfamily-held corporate farms. For the

Table 7: Type of Organization by Number of Farms, Land in Farms, and Value of Agricultural Products Sold for the 10 Leading Agricultural States and the Nation, 1978[1].

State	Number of Farms (Percent)				Land in Farms (Percent)				Value of Sales (Percent)			
	Family	Partnership	Corporation		Family	Partnership	Corporation		Family	Partnership	Corporation	
			F[2]	N[3]			F[2]	N[3]			F[2]	N[3]
California	80.6	13.9	4.0	0.8	50.3	25.9	15.9	5.5	35.0	24.7	27.7	12.0
Iowa	86.0	11.5	1.9	0.2	80.2	14.5	4.5	0.4	75.7	14.9	7.5	1.5
Texas	89.0	8.7	1.1	0.2	68.5	20.2	7.7	1.3	50.5	15.1	16.1	16.9
Illinois	86.2	12.1	1.0	0.2	79.6	16.7	2.7	0.5	74.9	18.2	4.8	1.6
Minnesota	89.3	9.2	1.2	0.2	82.9	12.6	4.0	0.3	76.7	13.2	8.3	1.6
Nebraska	86.3	9.8	3.3	0.3	71.9	13.8	12.7	0.5	59.7	14.1	21.2	4.9
Kansas	88.3	9.5	1.7	0.2	80.0	13.5	5.3	0.5	52.8	12.9	19.8	13.7
Wisconsin	88.3	9.7	1.6	0.1	81.2	13.1	4.7	0.7	74.3	14.5	8.8	2.1
Indiana	86.4	12.2	1.8	0.2	76.8	16.6	5.7	0.4	70.0	17.6	10.3	1.9
Missouri	88.7	9.8	1.2	0.1	80.9	14.6	3.9	0.3	75.7	15.8	7.1	1.3
NATION	87.8	9.7	1.8	0.2	66.7	15.5	10.1	1.6	61.6	16.1	15.1	6.5

[1] Percents do not total 100 because some types of farms (such as estates or trusts) are not included.

[2] F = Family held corporate farm

[3] N = Nonfamily held corporate farm

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

Nation as a whole, 9.7 percent of the farms were partnerships, 1.8 percent were family-held corporate farms and 0.2 percent were nonfamily-held corporate farms. Of the Nation's leading agricultural states, California had the largest percentage of both types of corporate farms.

Nationwide, the state with the largest percentage of total corporate farms was Arizona (8.3), followed by Montana (8.2) and Hawaii (6.2) (U.S. Department of Commerce, Bureau of the Census, 1978). Hawaii had the largest percent of nonfamily-held corporations. Of its total corporations, 28.5 percent were nonfamily-held.

Land in Farms. For the Nation, corporate farms controlled less than 12 percent of the land in agriculture in 1978 (Table 7). Family farms, on the other hand, accounted for two-thirds of the land in farms. Of the Nation's leading agricultural states, corporate farms operated more than 10 percent of the farmland only in California (21.4%) and Kansas (13.2%). Of the 9.1 percent of land controlled by corporate farms in Texas in 1978, 7.7 percent were operated by family farm corporations.

Value of Sales. Corporate farms accounted for 21.6 percent of all agricultural sales in the Nation in 1978 (Table 7). During that same time period, family farms earned 61.6 percent of the total value of agricultural products sold. Of the states listed in Table 7, sales from all corporate farms were most important in California (39.7%), Kansas (33.5%), Texas (33.0%), and Nebraska (26.1%). Of the Nation's leading agricultural

states, sales from nonfamily corporate farms were most important in Texas (16.9%), Kansas (13.7%), and California (12%).

Family farm income as a proportion of farm sales for the 10 states listed in Table 7 ranged from a high of 75.7 percent in Iowa and Missouri to a low of 35 percent in California. Texas ranked ninth of the 10 states in proportion of income earned by family farms (50.5%).

From the previous discussion, it is obvious that the average corportate farm is larger in both acreage and sales than is the average family farm. The magnitude of the difference is illustrated in Table 8. In 1978, the average family farm in America was 316 acres. This compares to 660 acres for the average partnership, 2,292 acres for the average family corporate farm, and 2,755 for the average nonfamily corporate farm. In Texas, the average family farm was 544 acres, compared to 1,624 acres for the average partnership, 4,688 acres for the average family-held corporate farm, and 4,362 for the average nonfamily-held corporate farm.

For the Nation, sales per farm also were much lower on family farms ($30,546) when compared with average sales from partnerships ($72,064), family-held corporate farms ($359,136), and nonfamily-held corporate farms ($1.2 million). In Texas, nonfamily-held corporate farms had gross sales averaging over $3.4 million in 1978. In comparison, sales from the average family-held farm corporation were $586,043, partnerships were $73,317, and $24,245 was earned by the average family farm.

Table 8: Average Farm Size and Average Sales per Farm by Type of Organization for the United States and Texas, 1978

	United States				Texas			
	Family	Partnership	Corporation		Family	Partnership	Corporation	
			F[1]	N[2]			F[1]	N[2]
Average Farm Size (acres)	316	660	2,292	2,755	544	1,624	4,668	4,362
Average Sales per Farm (dollars)	30,546	72,064	359,136	1,203,335	24,245	73,317	586,043	3,405,002

[1]F = Family held corporate farm

[2]N = Nonfamily held corporate farm

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

Commodities. Nationwide, corporate farms play a significant role in the production of a limited number of commodities (Albrecht and Ladewig, 1982b)--particularily those where corporate structure can fulfill critical marketing functions. In 1978, for example, all corporate farms accounted for 52.2 percent of the fattened cattle sales, 44 percent of the vegetable sales, 37 percent of the fruit, nuts, and berries sales, and 27 percent of the poultry sales. In comparison, corporate farms produced 6 percent of the soybeans, 6 percent of the corn, and less than 8 percent of the dairy products (U.S. Department of Commerce, Bureau of the Census, 1981). Thus, corporate farms sales are sizable in states which produce fattened cattle, vegetables, poultry, or fruit (California, Florida, Hawaii, Arizona, Nebraska, Texas, and Kansas). Conversely, family farm sales generally account for a larger proportion of the agricultural income in states that produce such commodities as corn, soybeans, and dairy products (Iowa, Illinois, Minnesota, and Wisconsin).

The major source of income for corporate farms in Texas comes from the sale of fattened cattle. Table 9 reflects the involvement of corporations, partnerships, and family farms in the sale of fattened cattle for the Nation and the 4 leading cattle feeding states. In Texas, corporations accounted for 2.4 percent of the farms that sold fattened cattle in 1978 while family farms composed 88.5 percent of the farms. A comparison of other states listed in Table 9 revealed similar distributions.

Table 9: Number of Farms Feeding Cattle, Value of Fattened Cattle Sales, Average Number of Fattened Cattle per Farm, and Average Sales per Farm for the Nation and the Four Leading States by Type of Organization, 1978[1]

		Texas	Kansas	Nebraska	Iowa	Nation
Number of Farms	(Total)	8,777	6,385	14,081	33,170	258,628
Family		88.5%	82.8%	83.4%	83.5%	85.8%
Partnership		8.8	11.9	11.1	13.6	11.6
Corporation -	Family	1.6	4.2	5.0	2.6	2.2
	Non-Family	0.8	0.9	0.3	0.1	0.2
Value of Fattened Cattle Sales ($1,000)	(Total)	2,545,813	2,084,986	1,956,640	1,908,976	15,336,671
Family		8.4%	19.8%	34.3%	67.7%	32.8%
Partnership		10.8	10.5	15.5	17.5	13.8
Corporation -	Family	29.2	36.6	39.6	11.3	30.5
	Non-Family	48.9	31.4	10.5	2.6	21.7
Average Number of Cattle Per Farm						
Family		58	145	112	92	47
Partnership		695	508	364	144	139
Corporation -	Family	10,676	5,257	2,021	472	1,565
	Non-Family	32,089	21,322	7,584	2,204	10,530
Average Sales per Farm (dollars)						
Family		27,388	78,136	57,207	46,685	22,690
Partnership		357,534	288,427	193,622	74,213	70,707
Corporation						
-	Family	5,206,385	2,861,719	1,091,690	248,857	822,733
-	Non-Family	17,534,803	11,911,618	4,190,816	1,204,452	5,787,861

[1] Percents do not total 100 because some types of farms (such as estates or trusts) are not included.

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. government Printing Office.

Although corporate farms in Texas were relatively few in number, they earned 78.1 percent of the $2.5 billion derived from fattened cattle sales in 1978. In contrast, corporate farms in Iowa accounted for 2.7 percent of the farms feeding cattle but earned less than 14 percent of that state's $1.9 billion from fattened cattle sales. In Texas, nearly one-half (48.9%) of the fattened cattle sales came from nonfamily corporate farms. This compares to 2.6 percent in Iowa. For the Nation, corporations accounted for 2.4 percent of the farms selling fattened cattle and 52.2 percent of the fattened cattle sales (Table 9).

Further comparisons of corporate farms in the 4 states listed in Table 9 indicate that corporate farm feedlots in Texas are much larger than for the Nation as a whole. Nationally, the average corporate farm fed 2,349 animals. This compares to 17,780 for Texas, 8,001 for Kansas, 2,300 for Nebraska, and 552 for Iowa (U.S. Department of Commerce, Bureau of the Census, 1981). In Texas, the average nonfamily corporate farm fed 32,089 animals, compared to only 2,204 in Iowa. As might be expected from the previous description, the income earned by the average nonfamily corporate in Texas from fattened cattle sales was much higher than that earned by the average nonfamily corporate farm in other states. Conversely, sales of fattened cattle from family farms in Kansas were nearly three times those of family farms in Texas (Table 9).

Implications

Although farms have become larger in size and fewer in number, the structure of agriculture continues to be diversified between and within regions of the Nation. In fact, those states producing a diversity of commodities have experienced sizable gains in cash receipts each year between 1978 and 1980. Conversely, those states primarily dependent upon one commodity generally have not experienced consistent growth.

It should be noted also that the vast majority of these commodities are produced on family farms. Corporate farming, especially nonfamily-held corporate farms, primarily have successfully entered only those areas of agriculture that are characterized as being capital intensive, experiencng rapid technological change and can utilize sophisticated marketing strategies. Corporate farm involvement in enterprises that are land intensive, such as corn or soybean production, has been limited (Albrecht and Ladewig, 1982b). Because the vast majority of corporate farms are family-held, one reason for the increasing number of partnerships and corporate farms in recent years may be the result of income tax and inheritance provisions that have made these types of organizations an attractive alternative to many family farmers. For Reimund (1979), these farms are indistinguishable from other large family farms because there is not a separation of capital, management, and labor.

However, the place of the medium-sized family farm (historically defined as 50 to 199 acres) remains insecure. As

the structure of agriculture becomes increasingly dualistic, it is the medium-sized farm that is disappearing most rapidly (Albrecht and Ladewig,1982b).

AGRICULTURE AND RURAL COMMUNITIES

The second task of this report is to examine the interchange between agriculture and rural communities. Just as changes in agriculture have affected the community, changes in community populations also have affected the structure of agriculture.

The family farm has been described as a major force in development and preservation of the rural community. Larson (1981: 150) explains that because of the land requirements for most types of farm production, there developed a low density of farm population and a dispersed settlement pattern in the countryside. Low density and dispersed settlement, in turn, fostered the development of relatively small-scale rural communities and local institutions, agencies, and organizations to serve the needs of this large agriculturally-related population. The industrialization of agriculture, however, produced many technological advances that directly replaced human labor in the production process. This, combined with the availability of unskilled jobs in urban areas and a desire to improve individual socioeconomic situations, led to a vast outpouring of people from rural areas. Many rural farming communities lost as much as half of their population between 1940 and 1970. In addition, the number of people living on farms declined from 30 million in 1940 to less than 10 million in 1970 (Beale, 1980). As a consequence, many towns and villages that once provided most of the necessary social and economic services for their residents and the nearby farm population and were

characterized by close interpersonal ties experienced an evaporation of functions, revenues, and capital values (Heady, 1970; Brinkman, 1974).

Wardwell (1982) reports that between 1960 and 1970 nonmetropolitan counties lost nearly 4 million people. Since 1970, however, these counties have gained approximately 3 million people. This reversal is the result of an increase in movement out of metropolitan counties and a decrease in movement away from nonmetropolitan counties.

One of the most important reasons for this population reversal is that many rural communities diversified their economic base to include industrial plants, recreation, and other types of nonfarm business (Beale, 1980). This, in turn, increased employment opportunities in rural counties (Beale, 1978).

The economic growth of rural counties and the population reversal have had two major impacts on agriculture. First, county population growth; the growth of new and more intensive forms of energy development; increased use of rural residences for part-time farming, recreation and retirement uses; and relocation of industries to rural areas are creating increased and often conflicting demands for the land, water, and other natural resources critical to agricultural production (Murdock and Hamm, 1981). Second, the rapid growth of the nonagricultural economy also helped many small farmers to remain in agriculture through off-farm employment.

Off-Farm Employment

Off-farm employment was once viewed as a temporary condition for families trying to accumulate capital and skills for entrance into farming on full-time basis or for those who were maintaining some form of agricultural production as a mechanism for easing their exit from agriculture (Heffernan et al., 1981). Today, however, off-farm employment is recognized as an increasingly stable component of the agricultural structure and as a relatively permanent life-style. For many families, off-farm employment provides a steady income to help stabilize a very volatile and risky farming occupation. For others, part-time farming provides some non-material benefits lacking in many non-farm occupations. As Paarlberg (1980) has stated, "Increasingly, people on small farms continue to live in the country, among friends and relatives, enjoying a culture they know and appreciate." For others, off-farm employment has eliminated one handicap of small-scale farming--low income.

Off-farm employment plays a vital role in agricultural production in both Texas and the Nation (Larson, 1981). The 1978 Census of Agriculture reports that over one-half (55.1%) of the farm operators in the United States were employed off the farm in that year and that 44 percent of the farm operators had 100 or more days of off-farm employment. Off-farm employment was even more extensive in Texas where 62 percent of the farm operators were employed off the farm and over one-half (52.7%) had 100 or more days of such employment in 1978.

Table 10 shows the proportion of farm operators having 100 or more days of off-farm employment for 1978 for the Nation and the 10 leading agricultural states. Of the 10 leading agricultural states, Texas had the highest percentage of farmers working off the farm 100 days or more in 1978. Conversely, Nebraska had the smallest percentage (22.7). On a national basis, Texas ranks 12th of the 50 states in proportion of farm operators having 100 or more days of off-farm employment. Again, there is tremendous diversity between the states. While 56 percent of the West Virginia farmers had off-farm employment of 100 or more days in 1978, less than one-quarter of the farm operators in North Dakota, South Dakota, and Nebraska were so employed (U.S. Department of Commerce, Bureau of the Census, 1981).

Nationwide there was a 4.5 percent increase in the number of farm operators with 100 or more days of off-farm employment between 1969 and 1978 (from 39.9 to 44.4 percent). Each of the 10 leading agricultural states experienced a similar increase.

Table 11 reports net income from farm and non-farm sources on a national basis for farm families by value of farm sales for the time period 1978 to 1980. The data indicate that all classes of farms experienced increases in off-farm income for each year considered. As might be expected, as farm sales decreased, off-farm income increased. In fact, for those earning less than $20,000 from farm sales, the less the net farm income, the greater the total family income during the time period examined.

Table 10: Percent of Farm Operators Reporting 100 or More Days of Off-Farm Employment and the Percent Listing Farming as Principal Occupation for the 10 Leading Agricultural States and the Nation, 1978

State	Percent Reporting 100 or More Days Off-Farm Employment	Percent Listing Farming as Principal Occupation
California	49.7	49.0
Iowa	27.8	74.5
Texas	52.7	41.4
Illinois	36.6	64.1
Minnesota	32.4	70.0
Nebraska	22.7	78.9
Kansas	36.3	65.0
Wisconsin	35.1	66.7
Indiana	50.5	49.8
Missouri	46.0	52.0
Nation	44.4	53.5

SOURCE: U.S.Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

Table 11: Income per Farm Operator Family by Farm and Off-Farm Sources and by Total Farm Sales for the U.S., 1978-80

	Farms with sales of						
	$100,000 and over	$40,000 to 99,999	$20,000 to 39,999	$10,000 to 19,999	$5,000 to 9,999	$2,500 to 4,999	less than $2,500
Net farm income[1]							
1978	49,204	21,322	11,449	5,771	3,240	1,940	1,719
1979	49,362	19,506	9,662	5,031	2,915	1,842	1,813
1980	33,972	16,674	8,280	4,299	2,512	1,512	1,821
Off-farm income							
1978	9,981	6,233	7,224	9,835	12,703	15,209	15,267
1979	11,675	7,292	8,623	11,844	14,361	18,534	18,618
1980	12,922	7,922	9,358	12,847	16,768	20,156	20,242
Total income farm and off-farm*							
1978	59,185	27,555	18,673	15,606	15,943	17,149	16,986
1979	61,037	26,798	18,285	16,875	18,276	20,376	20,431
1980	46,894	24,596	17,638	17,146	19,280	21,738	22,063

[1]Includes governmental payments, the value of farm products consumed in farm households and the rental value of farm dwellings and is calculated before inventory adjustment.

SOURCE: Economic Research Service, 1980. **Economic Indicators of the Farm Sector. Income and Balance Sheet Statistics, 1980.** USDA Statistical Bulletin No. 674, Washington, D.C.: U.S. Government Printing Office.

As off-farm employment has increased in importance, there has been a corresponding decrease in the proportion of farm operators who consider farming to be their principal occupation. Nationwide, only about one-half (53.5%) of the farm operators now consider farming to be their principal occupation. This proportion is even lower in Texas where less than 42 percent of the farm operators list farming as their principal occupation (Table 10). Again, there is much diversity among states. Less than 37 percent of the farm operators listed farming as their principal occupation in Alabama while three-fourths or more did so in Iowa, Nebraska, and North and South Dakota (U.S. Department of Commerce, Bureau of the Census, 1981).

Implications

The increased importance of off-farm employment has resulted in a stronger link between agricultural structure and the local economy. As a consequence, the ability of an area to retain part of its farm population may be directly associated with that area's ability to provide off-farm work for the farm population.

A second consequence of the rapid growth of the nonagricultural economy is that increased demands are being placed on some of the resources critical to agriculture. (Only California added more people between 1970 and 1980 than did Texas.) Future policy considerations must include efforts to integrate the management of land, water and other natural resources critical to both agricultural production and expanding rural population.

MEASURES OF ORGANIZATIONAL EFFECTIVENESS BY FARM CATEGORIES

Historically, preservation of the family farm system of agriculture has dominated agricultural development policies and programs. Although these policies and programs have contributed to making American agriculture the most efficient food producer in the world (Heady, 1976; Paarlberg, 1981), they also have had an impact on the structure of agriculture. Because the research and extension efforts of Land Grant Universities have played a major role in developing the science-producing base upon which the modern highly industrialized agriculture of the United States was built, the potential affects of changes in focus of and clientele served by Land Grant Universities must be considered.

As the data reported in this paper have illustrated, there are many ways to view the structure of agriculture and, consequently, the clientele toward which agricultural development policies and programs should be directed. In attempting to provide a focus on farm structure for future agricultural research and extension policies and programs and to insure that agricultural policy will work equitably for all involved, USDA has delineated four categories of farms based on farm sales and has recommended certain types of research and extension efforts be addressed to each category (U.S. Department of Agriculture, 1981). This section of the manuscript will describe the composition of the four categories, identify the proposed research and extension efforts to be directed toward each

category and discuss the potential impact of such strategies on the organizational structure of agriculture.

Farm Categories

Expansion of farms in the past has been the result mostly of decisions of individual farm families in responding to the forces of economic growth and public policy (Ball and Heady, 1971). In response to this trend, USDA has recommended that policies and programs be modified "with farm structure clearly in mind, so that such policies no longer encourage economic cannibalism within agriculture or short-sighted exploitation of agricultural resources with no thought for their use over the longer term" (U.S. Department of Agriculture, 1981: 143). USDA also stated that central to these modifications "are policies and programs that help the medium-sized and smaller farm operators obtain credit, achieve production efficiencies and marketing opportunities, protect their natural resources and the environment, have access to off-farm employment opportunities, and offset the bias toward bigness in tax policies" (U.S. Department of Agriculture, 1981: 143).

It was their recommendation that farm structure be divided into four categories as determined by gross farm sales. These categories are as follows: rural farm residences (gross agricultural sales of $5,000 or less); small farms (sales of $5,000 to $39,999); medium-sized farms (sales of $40,000 to $199,999); and large farms (sales of $200,000 or more). Table 12

presents a distribution of the four farm categories for the ten leading agricultural states and the Nation in 1978.

Rural Farm Residences. As a Nation, rural farm residences accounted for 38.1 percent of all farms. In Texas, however, nearly one-half (48.9%) of the farms are categorized as rural farm residences. Texas is followed by California (41.5%) and Missouri (35.1%) in having the largest proportion of rural farm residences. In terms of agricultural productivity, rural farm residences accounted for less than 2 percent of this Nation's cash receipts from the sale of agricultural products in 1978. USDA suggests that the major farm related problem of rural farm residences may be obtaining appropriate market outlets for agricultural commodities.

Small Farms. Small farms accounted for 38 percent of all farms in the Nation in 1978. Of the 10 states listed in Table 12, Kansas had the largest percentage (51.3%) of farms in the small farm category, while California had the lowest (30.9%). In Texas, small farms accounted for over one-third (35.8%) of the farms and about 12 percent of the total agricultural sales. On a national basis, less than 15 percent of cash receipts in 1978 came from small farms. USDA suggests that strategies to assist small farm operators should include nonfarm employment opportunities, marketing improvements, technical assistance, access to credit, and innovative forms of commodity and farm programs.

Table 12: The 10 Leading Agricultural States and the Nation by Number of Farms, Percent of Farms and Percent of Farm Sales from Rural Farm Residences, Small Farms, Medium-Sized Farms and Large Farms, 1978

State	Number of Farms	Percent of Farms				Percent of Farm Sales			
		Rural1	Small2	Medium3	Large4	Rural1	Small2	Medium3	Large4
California	81,706	41.5	30.9	17.4	10.2	0.6	4.4	14.2	80.8
Iowa	126,456	12.8	39.7	42.3	5.2	0.5	12.3	55.8	31.4
Texas	194,253	48.9	35.8	12.5	2.8	2.4	12.2	25.6	59.8
Illinois	109,924	20.4	40.0	35.3	4.3	0.8	13.9	57.4	27.9
Minnesota	102,963	22.9	43.2	31.2	2.7	1.0	18.7	55.7	24.6
Nebraska	65,916	12.5	44.2	39.0	4.3	0.4	11.1	40.6	47.9
Kansas	77,129	24.2	51.3	22.3	2.2	0.8	13.5	29.1	56.6
Wisconsin	89,945	24.5	43.0	31.0	1.5	1.3	21.3	60.5	16.9
Indiana	88,427	31.3	43.2	22.5	3.0	1.8	18.8	50.1	29.3
Missouri	121,955	35.1	46.4	16.9	1.6	2.9	26.4	49.2	21.5
NATION	2,478,642	38.1	38.2	20.4	3.3	1.8	14.5	39.4	44.3

[1]Farm sales of less than $5,000
[2]Farm sales of $5,999 to $39,999
[3]Farm sales of $40,000 to $199,999
[4]Farm sales of $200,000 or more

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

The importance of nonfarm employment opportunities for all categories of farms is reflected in Table 13 which reports the percentage of farmers in each class in the United States who worked off the farm in 1978. While nearly 60 percent of the farm operators with sales totaling less than $5,000 were employed off the farm 200 or more days, 8 percent of the farms with sales greter than $200,000 also had such employment.

A comparison of Tables 11 and 13 suggests a note of caution. Although average off-farm income is very high for rural farm residences and small-farm operators, the total number of farmers in these two categories who do not work off the farm is sizable. While some of these small farms without off-farm income are operated by aged persons, many are operated by bona fide, able-bodied farmers who depend on the farm for their livelihood. With limited farm income, such producers may require economic incentive and research and extension programs specifically designed for them.

Medium-Sized Farms. Medium-sized farms earned nearly 40 percent of this Nation's agriculture income and constituted over 20 percent of the farms in 1978. Since farming provides the major source of income for most farmers in this category, efficiency of production, marketing opportunities, and protection of natural resources and the environment are major concerns to be addressed in helping medium-sized farms.

Of the Nation's leading agricultural states, Iowa, Nebraska, and Illinois had the largest proportion of farms in the medium-

Table 13: Percentage Distribution of Days of Off-Farm Employment by Farm Categories for the United States, 1978

Days of Off-Farm Employment	Farm Categories (Number of farms) Percent Distribution				
	All Farms[1] (2,363,975)	Rural (916,246)	Small (894,258)	Medium (476,272)	Large (77,199)
None	42.3	25.9	41.5	69.6	78.1
1-99	11.2	7.4	12.5	16.1	10.6
100-199	8.3	9.0	9.8	4.6	3.2
200 and over	38.2	57.7	36.2	9.7	8.1
Totals	100	100	100	100	100

[1]Not all farm operators reported their off-farm employment status. Also excludes abnormal farms.

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1981. **1978 Census of Agriculture. Volume 1, Summary and State Data, United States.** Washington, D.C.: U.S. Government Printing Office.

sized category while Texas had the smallest (Table 12). It should be noted also that in 6 of the top 10 agricultural states (Iowa, Illinois, Minnesota, Wisconsin, Indiana, and Missouri), the medium-sized farm category accounted for more agricultural income than did any other category. Conversely, in Texas, medium-sized farms accounted for about one-fourth of the total agricultural sales in 1978.

Large Farms. Less than four percent of the farms in the United States are categorized as "large farms" (Table 12). However, these farms accounted for over 44 percent of this Nation's agricultural income in 1978. The state with the highest percentage of large farms was California (10.2 percent) where large farms accounted for 80.8 percent of the state's cash receipts from the sale of agricultural products. Iowa ranked second with 5.2 percent of the farms classified as large. However, large farms in Iowa accounted for less than one-third (31.4%) of the state's cash receipts. In Texas, less than 3 percent of the farms are in the large-farm category, but they earned nearly 60 percent (59.8) of the state's agricultural income in 1978.

USDA describes large farms as businesses that generate a combined current income and capital gains return fully comparable to returns in the nonfarm economy. For such business, income stability and cash flow are the primary concerns.

Implications

The adoption of the USDA farm structure categories to guide research and extension efforts would have different implications for different states. The focus of and clientele served by research and extension in the Midwest would require less adjustment than in other parts of the country because those states are still dominated, to a greater extent, by medium-sized, full-time farming operations. Conversely, in California, Texas and Kansas, large farms constitute a very small proportion of farms but sell over one-half of the value of agricultural products sold in their respective states. The consequences of changes in focus and clientele for agricultural production could be severe. Rural sociological research has established that personal, social, and economic characteristics of individuals affect the rate with which individuals adopt new practices and products (Rogers, 1962). Researchers also have studied the length of time required from when a person first hears of the product or practice until he actually adopts the product or practice. These data indicate that the personal and farm characteristics of those who adopt soon after awareness vary significantly from later adopters.

While it has been established that small farmers generally are later adopters than are medium and large-sized farmers, it also has been established that medium and large farm operators have more contact with research and extension programs than do small farm operators (U.S. Department of Agriculture, 1980).

Whether rate of adoption by small farm operators can be enhanced through more frequent participation in the ongoing research and extension programs remains to be established. In addition, efforts which concentrate on the needs of small farmers at the expense of larger farmers may have an adverse impact on the production of adequate amounts of food and fiber.

SUMMARY AND CONCLUSIONS

The industrialization of agriculture has enabled American farmers to become extremely efficient food and fiber producers. This process also has dramatically altered a family farm structure of agriculture deemed important to this Nation's well-being.

At present, there is not agreement on the type of farm structure that would best (1) contribute to agricultural production and allocative efficiency, (2) contribute to long-run growth of per capita real income, (3) facilitate full employment of resources, and (4) provide an equitable distibution of real income.

While it must be recognized that the economic performance of the farm firm cannot be ignored, it must be recognized also that the interchange between agriculture and American society is increasing in complexity. In addition, the nonfarm population of rural areas is increasing and more complex social structures are developing within both the structure of agriculture and the communities in which farmers reside. Knowledge of this interchange is necessary if those who are now generating issues affecting agriculture are to better understand the implications of the industrialization of agriculture for the family farm, the community, and the research and extension efforts of the Land Grant Universities which have contributed to the science producing base upon which this Nation's family farm system of agriculture is based.

As this report demonstrates, there is considerable complexity and diversity to this Nation's agriculture. As such the impact of changes in policies and programs cannot be accurately predicted without a clear understanding of the performance of the different types of agricultural structures that exist within and between the various states.

That such variation exists in agricultural structure among the states has several research implications which must be addressed if the historical policy of the United States Congress to encourage and foster a production structure of agriculture that gives good performance is to be obtained. First, some states are more specialized than others. In reference to the ten leading agricultural states examined in this study, those states incurring sizable gains in cash receipts from the sale of agricultural products during recent years also earned cash receipts from a diversity of major commodities and had less dependence on corporations. Thus, while the specialization of enterprises and dependence upon corporations to fulfill such functions as finance and marketing may be beneficial to the individual farmer in a stable or growing economy, the consequences of such dependence in a volatile or declining economy must be addressed. As Paarlberg (1980: 194) has noted, the family farmer has incentive beyond that of a hired manager. "If times are hard, the family farmer takes in his belt, pays himself a lower wage, and is there ready to go, when things improve. Compare this with the handicaps of corporate farming:

unionized wages, harvest time strikes, limited working hours, prescribed working conditions, unmotivated labor, and the need for detailed supervision."

Second, substantial variation exists among states in the number of farmers dependent on off-farm employment. In Texas, over one-half of the farmers worked off the farm 100 days or more in 1978 and nearly 60 percent listed their primary occupation as "other than farming." Little is known about the extent to which full-time off the farm employment constrains development of the farm (Coughenour and Wimberley, 1982).

Third, small-scale farms comprise 76 percent of all farms in this Nation. Some believe that this category of farms strengthens the resilience of U.S. agriculture in economic and market crises to which large-scale farms are more vulnerable. In addition, such farms supply many consumption needs in their own households and can supply many local markets while using less transportation and energy. Finally, small and part-time farm families produce an important share of many commodities, and their share can be increased (Coughenour and Wimberley, 1982).

Additional research is needed to identify the characteristics of small-scale farmers and ways they can benefit from research-extension activities. Tweeten (1979), for example, suggests that small-scale farms be viewed as three distinct categories and raises the question of how beneficial research and extension activities are to each of the categories. The first category, the aged and disabled full-time farmers, will benefit

from improved welfare programs but will not benefit greatly from farm production-marketing research and extension programs. Many of the small-scale farmers who do not work off the farm fit this category. The second category, those who are primarily nonfarm workers reside on farms, can benefit from increased research-extension activities of Land Grant Universities. However, as indicated in Table 10, average off-farm income from small-scale farmers in 1980 ranged from $9,000 to over $20,000. Many of these people do not have low incomes and may not have time to participate in research-extension activities. The third category, the residual of able-bodied, bona fide small-scale farmers who rely on farm earnings for their livelihood, can benefit from credit assistance to help expand operations, rural development activities that provide nonfarm jobs and research-extension activities to improve efficiency while remaining small.

Finally, the impact of nonagricultural trends on the structure of agriculture must be examined. Such trends include the rate of growth of a state's population; the growth of new and more intensive forms of energy development; increased use of rural residences for part-time farming, recreation, and retirement uses; and relocation of industries to rural areas (Murdock and Hamm, 1981). These trends are creating increased and often conflicting demands for the land, water, and other natural resources critical to agricultural production.

At this time there is limited information available to discern the most efficient distribution of resources to meet the

needs of agriculture and those who live and work in an increasingly complex rural environment. If present trends continue, policy decisions affecting rural life in general, and agriculture in particular, will be influenced by representatives of a largely urban America concerned primarily with consumer issues, environmental programs and rural development. As such, it is imparitive that the interchange between agricultural production and the rural comunity be examined. We can neither ignore the needs of the individual farm firm or the consequences of production on consumer nutrition, land settlement patterns, quality of life in rural communities, and the use of natural resources.

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